



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,397	11/26/2003	Shih-Jong J. Lee	SV31	8873

29738 7590 04/04/2007
SHIH-JONG J. LEE
15418 SE 53RD PLACE
BELLEVUE, WA 98006

EXAMINER

BITAR, NANCY

ART UNIT	PAPER NUMBER
----------	--------------

2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/723,397	LEE ET AL.	
	Examiner	Art Unit	
	Nancy Bitar	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/26/03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 11/26/2003 has been considered by the examiner.

Drawings

3. The Examiner has approved drawings filed on 11/26/2003.

Examiner Notes

4. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2624

6. Claims 1-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kurosawa et al (U.S. Patent 4,972,499), Silver et al (U.S. Patent 7,164,796) and McConnell (U.S. Patent 4,567,610)

As to claim 1, Kurosawa teaches a fast high precision matching method comprising the steps of:

- a) Input an image (figure 1, element 12, column 3, lines 39-40);
- b) Input a template (column 4, lines 8-13, note that in figure 2 all the references templates are located in the database);
- c) Perform initial search using the input image and the template to create an initial search result output (figure 1, element 18 and 22, column 3, lines 51-62);
- d) Perform high precision match using the initial search result, the input image, and the template to create a high precision match result output (figure 1, element 24 and 26, column 4, lines 62-67, column 4, lines 1-21).

Kurosawa is silent about using invariant pattern search. However, McConnell discloses invariant pattern search (fig 2a -c and 3a-d and column 8, lines 36- 59, column 9, lines 30-49, the invariant search are comparing test and reference histograms).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Kurosawa by the teaching of McConnell because to map objects having characteristic radial features to determine orientation and for identification to improve the flexibility of the recognition system (as suggested by McConnell at column 9, lines 67-68, column 10, lines 1- 2, the output signal from the CPU, see equation 9, is

Art Unit: 2624

the image output also see column 11, lines 4-41, the histograms that are generated are use to calculate the entropy being use for matching process). Neither Kurosawa nor McConnell discloses the match as being high precision. Specifically, Silver et al. teaches the "perfect fit" that correspond to the best match of the search result the initial image (image 130) and the template image (training image 100) in order to get a location accuracy and a highest degree of match (column 10, lines 24-52); Because the perfect fit help in identifying differences between a stored pattern and a matching image subset, where variations in pattern position, orientation, and size do not give rise to false differences. It would have been obvious to one of ordinary skill in the art to use pattern inspection of an image in Kurasawa matching method in order to minimize the false differences between the pattern and image that can limit inspection performance (column 5, lines 50-62) thus resulting in an overall method for pattern inspection that is faster and more accurate. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 2, Silver et al. teaches method of claim 1 wherein the high precision match step comprises the estimation of high precision parameters by image interpolation and interpolation parameter optimization (interpolation method, figure 17).

As to claims 3 and 4, Silver et al et al. teaches the method of claim 1 wherein the high precision match step comprises a high precision match within and beyond one pixel range (the bits of field element 400 are divided between force 410 and direction 420 to provide greater or lesser precision and range, as needed for each particular application (column 14, lines 52/57; note that appropriate settings for the parameter

Art Unit: 2624

values depend on the nature of the patterns and images to be analyzed, column 13, lines 66-67).

As to claim 5, McConnell et al. teaches the method of claim 1 wherein the high precision match step performs robust matching (column 22, lines 1-15, see also Silver et al. column 12, lines 20-61).

As to claim 6, Silver et al. teaches the method of claim 5 wherein the robust matching limits pixel contribution (gray-level pixel-grid-based methods are used for pattern inspection, column 3, lines 38-51).

As to claim 7, Silver et al. teaches the method of claim 5 wherein the robust matching performs pixel weighting (assign a weighting factor to each image dipole to indicate the relative reliability of the evidence; column 4, lines 63-67 and column 7, lines 32-50).

As to claim 8, Silver et al. teaches the method of claim 2 wherein the image interpolation includes linear interpolation (straight line, figure 6, column 15, lines 59-67).

As to claims 9- 10, Silver et al. teaches the method of claim 9 wherein the template contains pre-calculated template variance parameters (Several parameter values are needed for feature extraction, both in the training module 110 and in the run-time module 140, column 13, lines 57-65).

As to claims 11-12, teaches the method of claim 2 wherein the interpolation parameter optimization includes matching function maximization uses an iterative method (figures 22-25).

As to claim 13, Silver et al teaches the method of claim 4 wherein the high precision match beyond one pixel range comprising the steps of: a) Perform neighboring position creation using the initial search result to create a plurality of neighboring positions (neighboring position 700, column 16, lines 47-64); b) Perform matching function maximization on each of the plurality of neighboring positions to create a plurality of maximum of optimal sub pixel matches (figure 7, 7a, 7b, 7c, connection of dipole, note that dipoles represents pixels) ; c) Perform maximum and position determination using the plurality of maximum of optimal sub pixel matches to create the optimal sub pixel values (a sub-pixel interpolation module 360, column 13, lines 28-36) .

The limitation of claim 14-16 has been addressed in claims 1,3,4 and 10

The limitation of claims 17-27 has been addressed above except for profile generation. McConnell teaches this limitation (invariant profile generation; pages 6 and 7 of the details description of the invention, figure 2a-c and 3a-d and column 8, lines 36-59, column 9, lines 30-49) in order to create an invariant high precision match result output (see McConnell figure 1,9-34 and column 13, lines 47-67, the histogram that are generated are used to calculate the entropy being use for the matching process.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kurosawa to include (invariant image and template profile generation). It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Kurosawa by the teaching of McConnell, which is the generation of invariant profiles because to map objects having characteristic radial

Art Unit: 2624

features to determine orientation and for identification to improve the flexibility of the recognition system (as suggested by McConnell at column 9, lines 66-67, column 10, lines 1-2).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lin et al., (US.7, 039,229 B2) discloses locating regions in a target image using color match, luminance pattern match and hill-climbing techniques.

Manickam et al., (US.6, 272,247B1) discloses rotation and scale invariant image Finder.

Wagman (US.6, 798,925B1) discloses method and apparatus for calibrating an image acquisition system.

Fukui et al., (US.5, 982,912) discloses person identification apparatus and method using concentric templates and feature point candidates.

Nakano et al., (US.6, 088,483) discloses image-processing method for system employing pattern matching.

Schmidt et al., (US.6, 944,331 B2) discloses locating regions in a target image using color matching, luminance pattern matching and hue plane pattern matching.

Inquiries

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nancy Bitar whose telephone number is 571-270-1041.

The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

Art Unit: 2624

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on 571-272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nancy Bitar

3/28/2007



JOSEPH MANCUSO
SUPERVISORY PATENT EXAMINER